

Scanning apparatus for fluorescent multi-layer storage.

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## 5 FIELD OF THE INVENTION

The present invention relates to a scanning apparatus for scanning information in an information carrier comprising a plurality of layers for storing data on a material capable of generating an excited radiation when interacting with an exciting beam produced by an exciting source, said apparatus comprising an  
10 objective lens for projecting the exciting beam in a layer of the carrier and collecting the excited radiation, said objective lens having a lens numerical aperture, and a detector unit for detecting the excited radiation collected on the objective lens.

The present invention is particularly relevant for an optical disc apparatus for reading and/or recording data from and/or to a fluorescent multi-layer  
15 disc.

## BACKGROUND OF THE INVENTION

A scanning apparatus for fluorescent optical storage reading is described in US 6,009,065. Information carriers are organized in the form of a multilayer optical disc. The  
20 information is deposited or recorded as a sequence of fluorescent and non-fluorescent cells, the fluorescent cells being made of a material capable of generating an excited radiation when interacting with an exciting beam. The layers of the carrier are separated by thick layers, which are transparent to the wavelengths of the exciting beam and the excited radiation. Such a multilayer optical disc comprises a plurality of layers, from 2 to 100 or even  
25 more.

The exciting beam is focussed with an objective lens on a layer of the disc. When a fluorescent cell is illuminated by the exciting beam, a fluorescence signal is generated. This fluorescence signal has a wavelength, which is different from the wavelength of the exciting beam, and is detected by a detector unit. The detector unit comprises means  
30 for separating the fluorescence signal coming from the in-focus layer from the fluorescence signals coming from the out of focus layers. For example, a confocal pinhole is inserted in front of a photodiode in order to spatially block the fluorescence signal coming from the out-of-focus layers.

Fig. 1 illustrates a scanning apparatus for multilayer optical storage. Such a  
35 scanning apparatus comprises an exciting source 11, a collimator lens 12, a dichroic mirror